



CHAPTER 4

Long-Term Forecast of Washington Personal Income

TRENDS IN WASHINGTON PERSONAL INCOME reflect the pace of the state's economic and population growth. For private businesses, the size and composition of personal income provide a good measure of markets and consumer demand. For governments, personal income is an important parameter in monitoring state economic conditions, anticipating tax revenues, and assessing the level of services required.

Per capita personal income is often used as an indicator of economic well-being of the residents in an area. Trends in state per capita income reflect local economic growth, population characteristics, poverty status, business climate, standard of living, and the state's obligation and ability to provide adequate public services (e.g. the means-tested entitlement programs).

Total Personal Income Trends

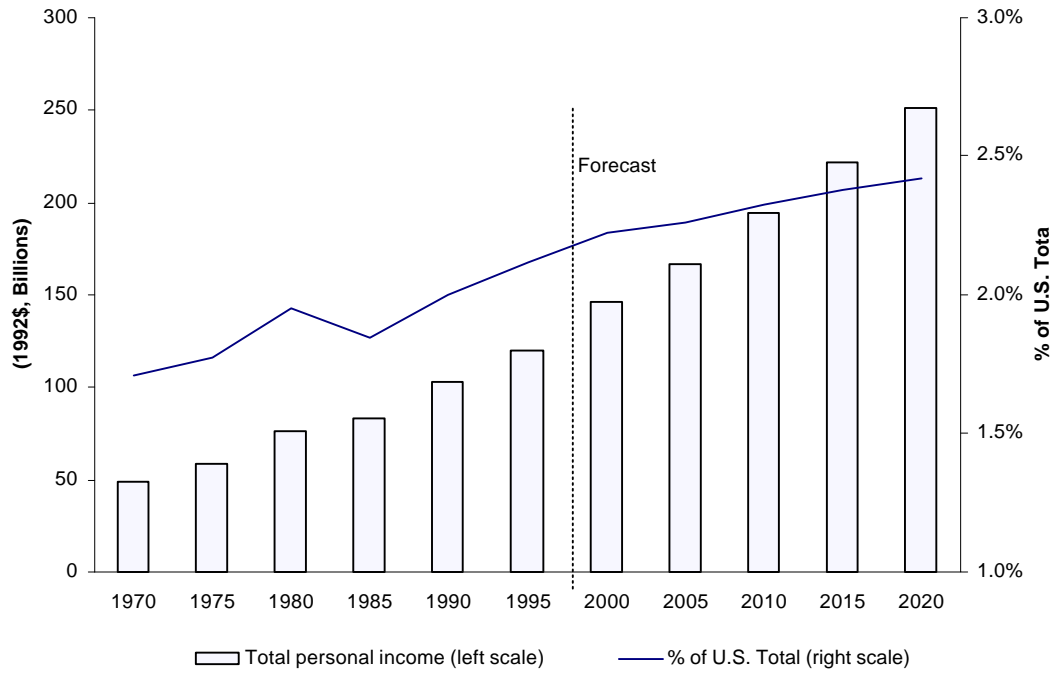
In 1998, total personal income in Washington was \$159.5 billion. After adjusting for inflation, total state personal income in 1998 was 2.9 times its 1970 level, representing an average annual growth rate of 3.9 percent. Total personal income in the state, in constant 1992 dollars, is projected to grow an average 2.6 percent a year between 1998 and 2020.

This future growth is a significant slowdown from the level that the state experienced in the past three decades. The predicted slowdown in personal income growth reflects the expected lower growth in population and in real per capita personal income. The latter factor roughly reflects the trend of "productivity changes" in the national and state economies. Productivity growth nationally was very strong in the three decades following World War II. Although productivity has improved in the 1990s, with further gains expected next decade, productivity is not expected to grow at the rates achieved before the mid 1970s.

Washington State in 1998 accounted for 2.2 percent of total personal income in the nation, a significant increase from the 1.7 percent share in 1970. The increased share reflects the fact that the state economy and population have been expanding faster than the nation as a whole (Figure 4-1). This trend is expected to continue. By 2020, according to the forecast, about 2.5 percent of the nation's total personal income will be in the state.

Personal income growth fluctuates with the business cycle. Long-term personal income growth in Washington closely mirrors the national trend, but with more erratic and volatile short-term movements (Figure 4-2). However, volatility in state personal income trends seems to have abated since the mid-1980s. The trend toward more stable income growth is attributable to the declining role of cyclical industries and the growing diversification of the Washington economy.

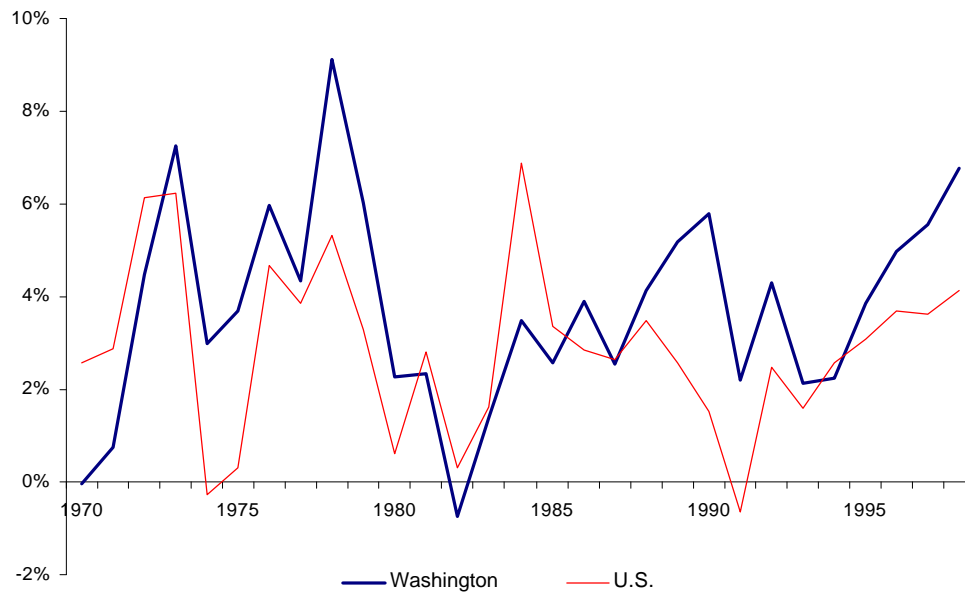
Figure 4-1
Total Personal Income: Washington, 1970-2020



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Figure 4-2
Annual Change in Total Real Personal Income



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Income Growth by Component

Personal income, as defined by the Bureau of Economic Analysis, has three major components: (1) earnings (wages, other labor income, and proprietors income); (2) dividends, interest, and rent; and (3) government transfer payments. In 1998, earnings accounted for 68.6 percent of total personal income in Washington; and dividends/interest/rent and transfer payments represented 16.6 and 14.7 percent of total personal income, respectively. These three income components have been growing at varying rates over the past three decades (Table 4-1).

- **Earnings.** Washington real total earnings (using 1992 constant dollars) almost tripled from 37.4 billion in 1970 to 102.9 billion in 1998. The average annual growth rate of earnings was 3.7 percent, somewhat lower than the 3.9 percent rate for total personal income growth. Earnings growth is, understandably, subject to cyclical factors. The annual rate of real earning growth in the state has dipped to as low as -3.4 percent during the 1969-70 period, and has risen to a high of 10.0 percent in 1977-78.

In the first half of this decade, growth in total earnings in Washington significantly slowed. The 1.5 percent increase in 1993-94 was the lowest earnings growth the state has experienced since the 1982-83 recession period. Cutbacks in the aerospace industry were the major factor for the mediocre performance. Earnings growth, however, rebounded strongly to 6.8 percent per year in the 1995-98 period.

Table 4-1
Real Income Growth by Component: Washington

Income Components	Average Annual Growth Rate (%)						1970-98
	1970-75	1975-80	1980-85	1985-90	1990-95	1995-98	
Total Personal Income	3.8	5.5	1.8	4.3	3.0	5.7	3.9
Earnings	3.3	5.2	0.5	4.7	2.9	6.8	3.7
Dividends, Interest, and Rent	2.8	8.7	5.3	4.1	1.6	4.4	4.5
Transfer Payments	8.8	3.7	4.4	3.1	5.3	2.3	4.7

Earnings growth has also varied significantly among industries (Table 4-2). Farm income in real terms has been flat since 1970, and its share of total earnings in the state declined from 3.3 percent in 1970 to 1.1 percent in 1998. Earnings from manufacturing increased 89 percent, but its share of total earnings declined slightly from 23 percent in 1970 to 20 percent in 1990, and to 17 percent in 1997.

Despite substantial job gains, retail and wholesale trade has shown only modest growth in earnings. Actually, retail and wholesale trade earnings as a share of total earnings declined from 17 percent in 1970 to 16 percent in 1997 – a result of these sectors' low wage levels and slow wage growth. Earnings from the services industry increased fourfold over the 1970-97 period, increasing at an annual rate of 6.2 percent – far above the 3.5 percent growth rate for total earnings. Services cover a wide range of sectors and occupations. Earnings in services started accelerating in the second half of the 1980s, as more growth took place in the high-

paying sectors such as business and health services. Since earnings are such a large proportion of total personal income, a special section at the end of this chapter is devoted to analyzing the sources of changes in average earnings.

Table 4-2
Growth in Real Earnings by Industry: Washington

	Average Annual Growth Rate (%)						
	1970-75	1975-80	1980-85	1985-90	1990-95	1995-97	1970-97
Total Earnings	3.3	5.2	0.5	4.7	2.9	5.9	3.5
Farm	13.5	-8.0	-8.3	3.4	-2.4	-1.3	-0.7
Manufacturing	1.8	6.7	-1.3	4.2	-1.0	6.9	2.4
T.C.U.	2.8	5.2	0.5	3.4	4.1	7.9	3.6
Wholesale & Retail	3.7	4.5	1.0	3.2	2.8	4.0	3.1
F.I.R.E.	1.2	8.3	0.1	6.0	5.6	6.3	4.4
Services	4.6	8.0	3.7	7.4	5.9	9.3	6.2

T.C.U.=Transportation, Communication, and Utilities. F.I.R.E.=Finance, Insurance & Real Estate.

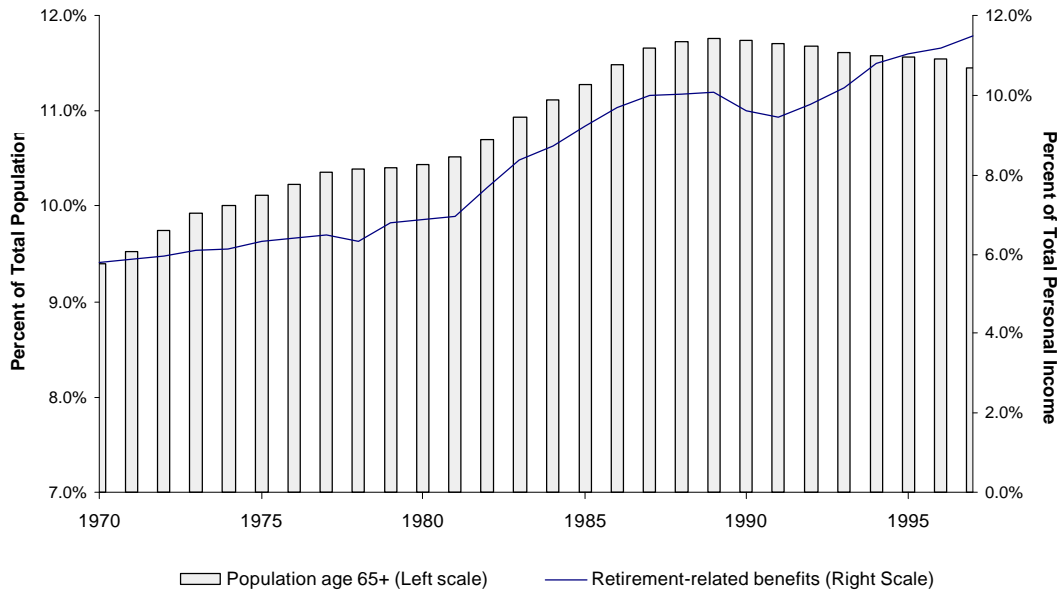
- **Dividends, interest, and rent.** The proportion of total personal income in Washington derived from property- and saving-related income (i.e., dividends, interest, and rent) increased steadily from 14.3 percent in 1970 to 16.6 percent in 1998. The share of income from these sources increased in the 1980s due in part to high interest rates early in the decade. Soaring property value in the second half of the decade added to this growth. Between 1990 and 1995, real income from dividends, interest, and rent grew at an annual rate of 1.6 percent in the state, far lower than the long-term average of 4.5 percent. Over the period from 1995 to 1998, this component of personal income rebounded to a healthy annual growth rate of 4.4 percent, thanks to rising real estate property value in the state and a healthy equity market.

In the near term, income from dividends, interest, and rent is affected mainly by monetary and cyclical factors. Over the long run, it reflects past earnings and savings behavior. The future growth of this component of personal income thus depends on the state's ability to retain and attract families with the ability and propensity to save and invest.

- **Transfer payments.** The importance of transfer payments as a source of personal income has increased in the past three decades. In Washington, total transfer payments in real terms increased at an annual rate close to 5.0 percent. Transfer payments as a share of total personal income increased from 11.7 percent in 1970 to 14.7 percent in 1997. The growth of transfer payments mainly reflects the impact of the government policies dealing with social security, welfare, and unemployment.

In 1997, more than three-quarters of total transfer payments in the state were retirement and disability insurance benefits and medical payments. The level of transfer payments is affected by the state's demographic profile and relevant state and federal regulations (Figure 4-3). Aging of the population in the next few decades should contribute to the growth of this component of personal income.

Figure 4-3
Elderly Population and Retirement-Related Payments*



* Includes government retirement and disability insurance benefit payments, and Medicare payments to individuals.

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A significant portion of transfer payments is counter-cyclical in nature. In Washington, income derived from income maintenance and unemployment insurance benefit payments accounted for as high as 24 percent of total transfer payments during the cyclical trough in 1971, and as low as 10.7 percent in 1990 when the state economy peaked in the last business cycle. The share rose in the earlier 1990s, only then to settle back to 11.4 percent in 1997. The data presented here on transfer payments do not yet reflect the effects of state “welfare reform.” Changes in eligibility requirements for public assistance programs have resulted in reduced caseloads, which should have a dampening effect on growth in transfer payments in the years ahead.

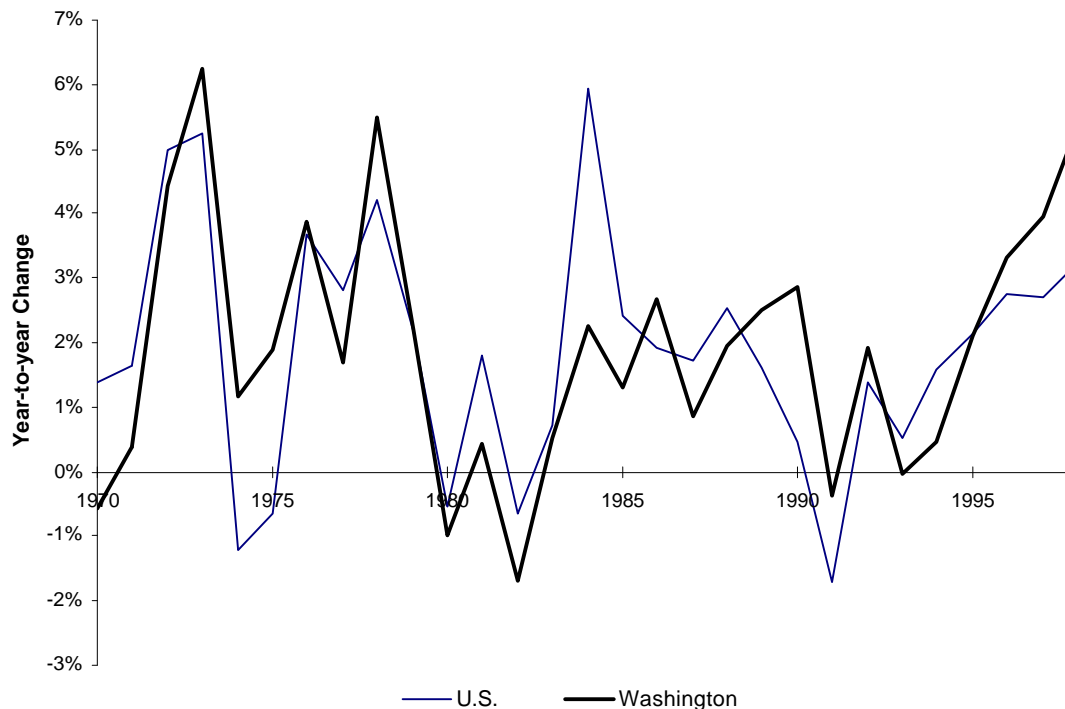
Per Capita Income Trends

Real per capita income is derived by dividing total state personal income by total population in the state, then adjusting this figure for inflation using the Implicit Price Deflator (IPD) for personal consumption from the National Income and Product Account (1992 = 1.0).

In 1998, real per capita personal income for the state was estimated at \$24,770, which was about 6.1 percent above the U.S. average of \$23,355. The state real per capita income in 1998 was 75 percent higher than in 1970. Between 1970 and 1998, Washington State real per capita personal income grew at an average annual rate of 2.0 percent. The growth did not follow a smooth path, but fluctuated with state economic conditions. During most of the expansion periods, state per capita personal income rose faster than the U.S. average. Conversely, per capita personal income

growth in Washington usually plummeted below the national trend during recessions or periods of slow economic growth (Figure 4-4).

Figure 4-4
Annual Changes in Real Per Capita Income



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In the past, substantial growth in the state's aerospace industry, along with the industry's high wages and salaries, played a major role in the growth of Washington personal income. This was evident during the 1965-70 period when real per capita income in the state increased nearly 4.5 percent per year. On the other hand, the 1981-83 national recession was particularly hard on the Washington economy. The state economy was hit severely and remained in recession longer than the national economy, resulting in poor performance in per capita income growth.

Since the mid-1970s, growth in real per capita personal income has slowed, both in the state and in the nation. The slowdown in per capita personal income growth was more severe in the state than the nation through most of the 1980s. However, since 1988 the state has regained some ground relative to the nation in per capita income growth.

At the national level, the most commonly cited reason for sluggish personal income growth during the 1980s was the slowdown in productivity growth. This factor certainly also played a significant role in earnings and income changes in the state. In addition, the state economy suffered from the collapse of non-oil commodity prices during the 1970s and the early 1980s that hurt its resource-based industries. Other contributing factors include the appreciation of the dollar in relation to foreign currencies in the first half of the 1980s which affected sales and employment in the state's export industries. The rise in real interest rates in the 1980s also

contributed to lower demand for Washington's durable goods products. Two local developments in the early 1980s – the sudden termination of the Washington Public Power Supply System construction project and the loss of jobs in the shipbuilding sector – exerted large, negative effects on state earnings and personal income.

In the second half of the 1980s, Washington experienced substantial job growth in aerospace and high-tech manufacturing industries. At the same time the state saw significant growth in the evolving high-wage “knowledge-based” service sectors. In addition, Washington's export industries were aided by a decline in the value of the dollar relative to other currencies. As a result, real per capita income grew faster in the state than in the nation. By 1990, real per capita income in the state rose to a level 2.0 percent above the national average.

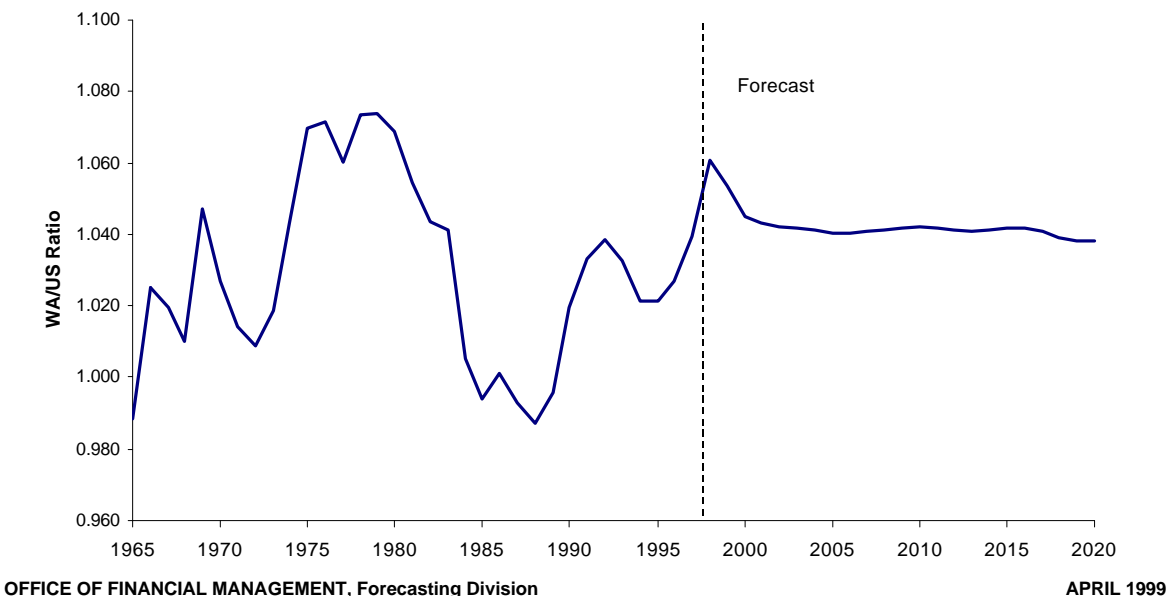
The state's economy was still at full strength in 1990 when the U.S. economy was entering into a recession. In 1991, the aerospace sector started cutting back production to accommodate a shrinking commercial aircraft market. The negative income effect of the aerospace reduction offset to a large extent the income growth brought about by other prospering sectors (e.g., machinery manufacturing and business services) in the state. Real per capita income growth in Washington thus slowed down in the early 1990s, although the nation as a whole suffered an even greater drop in income growth. Between 1993 and 1995, the Washington economy stalled due to on-going job reductions in aerospace, while at the same time the national economic recovery picked up pace. Per capita income growth in the state thus deteriorated relative to the U.S. average during this period.

The Washington economy has accelerated strongly since 1995. Manufacturing employment increased 13.9 percent, or 46,300, from 1995 to 1998. Besides strong national economic growth that raised the demand for goods produced in the state, two-thirds of the manufacturing growth came from hiring at Boeing to accommodate surging airplane orders. By 1998, job growth in Washington was broad-based, covering both manufacturing and non-manufacturing sectors of the economy. Consequently, the state unemployment rate dipped to 4.7 percent, far below the average of 7.6 percent in the past two decades; and the employment-to-population ratio rose to a historic high. All of these have contributed to a big jump in per capita income growth.

Over the long run, per capita income in Washington has trended closely with the national average. State per capita income averaged 3.1 percent above the national level during the 1970-95 period. However, the volatility of certain manufacturing and resource-based industries in the state periodically narrowed or widened the per capita income gap between Washington and the nation. Although Washington per capita personal income is once again higher than the national average, the state has never regained the wide lead it held in the late 1970s (Figure 4-5).

Changes in average earnings that have affected the state per capita income trends are discussed in the special section at the end of this chapter.

Figure 4-5
Ratio of Washington to U.S. Per Capita Income



Outlook for Personal Income Growth in Washington

In the future, the Washington economy is expected to continue its diversification, with an industrial profile moving closer to that of the nation. This development means that the state will likely experience more stable economic growth, and less volatility in its personal income trends. But does this mean that the state's per capita income level will converge to the national average in the future?

Long-term projections of state personal income growth (using a model discussed in Appendix A) suggests that Washington will maintain a per capita personal income level around 4.0 percent above the national average over the forecast horizon. Several factors contribute to the comparative strength of Washington's per capita income outlook:

- In the two decades after the year 2000, worldwide aircraft demand is expected to remain strong.
- Washington will maintain a relatively strong manufacturing base. For example, agriculture and food products in the state will continue to benefit from the improving access to worldwide food markets; and these markets are expected to expand rapidly as a result of increasing consumption by rapidly growing Pacific Rim economies. (The recent financial and economic turmoil in the Eastern Asia countries will have a drag on these export industries in the near term, but the long-term prospects remain promising.)

- Also, the state's high wage durable goods and high-technology industries will benefit from the expected macroeconomic trends toward lower and more stable real interest rates, accompanied by increasing international demand for capital goods.
- A more integrated global economy will help expand state exports and stimulate export-related business activities. Furthermore, Washington has the geographic advantage that endows it with great potential to attract foreign investments.
- Recent business expansion and investment activities in the state suggest that the state has the critical mass to continue attracting a variety of high-tech manufacturing and knowledge-based business service industries. The growth of high wage jobs in these industries will help raise the state's per capita income.

A per capita income projection model, which is described in the Appendix A to this chapter, was built to forecast state personal income growth. It incorporates the major factors that are critical to explaining per capita income growth in Washington compared with the nation.

Per Capita Income Growth Trend

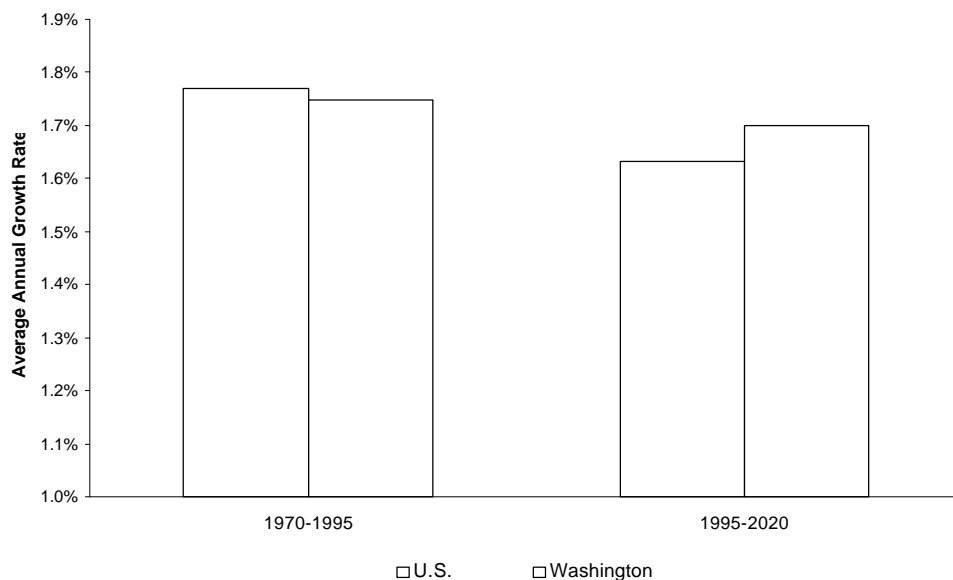
Between 1970 and 1995, real per capita income in the state grew at an average 1.7 percent per year. In the next 25 years, annual real per capita income growth is expected to remain at the same level of 1.7 percent (Figure 4-6), which is still faster than the projected U.S. per capita income growth. The lack of increase in the growth rate is caused by the expected decline in labor force growth and lowering of the employment-to-population ratio, both resulting from an aging population. These negative factors are somewhat offset by gains in productivity. The same trends will prevail nationally.

Productivity gains are expected to derive from the large investments made over the past decade in computer and telecommunications infrastructure, as well as from corporate organizational and management reforms. The per capita income forecast is essentially conservative in that it assumes relatively modest gains from these investments and reforms.

Table 4-3 shows the long-term personal income forecasts for Washington and the U.S. State per capita personal income, in 1992 constant dollars, will increase 14.6 percent from \$21,892 in 1995 to \$25,098 by the year 2000. This results in a widening gap between Washington and the U.S. – from 2.1 percent in 1995 to 4.5 percent in 2000.

The surge in the state per capita income between 1995 and 2000 appears front-loaded. Between 1995 and 1998, the strong state economy propelled per capita income growth to 4.2 percent annually. However, from 1998 to 2000, the projected per capita income growth for the state significantly slows to a yearly rate below 1 percent due in part to the global economic trauma and job layoffs in the aerospace industry.

Figure 4-6
Real Per Capita Income Growth



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Between 2000 and 2020, real per capita income growth in Washington is expected to average 1.4 percent per year, about the same as the forecast for the nation as a whole. By 2020, real per capita income in Washington will rise to \$33,355, about 35 percent above the 1998 level, and the state-national difference will be about 3.8 percent.

Helped by strong population growth, total state personal income is expected to nearly double over the next quarter century, from \$141.5 billion in 1998 to \$251.2 billion in 2020 (1992 constant dollars). This represents an average annual growth rate of 2.6 percent during the 1998-2020 period, higher than the 2.3 percent rate projected for the nation. As a result, Washington's share of total national personal income increases from 2.2 percent in 1998 to 2.4 percent in 2020.

Special Analysis: Trends in Earnings

Earnings¹ account for more than two-thirds of total personal income. Changes in earnings thus set the tone for personal income growth. This section explores the sources of earnings changes in Washington over time.

¹ The definition and data for earnings are derived from the personal income data for the U.S. and Washington as published by the Bureau of Economic Analysis, U.S. Department of Commerce. Earnings include not only wage and salary disbursements, but also other labor income and proprietors' income. Other labor income consists of the contributions by employers to privately administered benefit plans for their employees. This includes pensions and profit-sharing plans, group health and life insurance, supplemental unemployment insurance, privately administered worker's compensation plans, directors' fees, and other miscellaneous fees. While this definition of earnings does not include the value of all non-wage benefits, it is a much broader definition of total compensation than just wage and salary disbursements.

1999 LONG-TERM ECONOMIC AND LABOR FORCE FORECAST

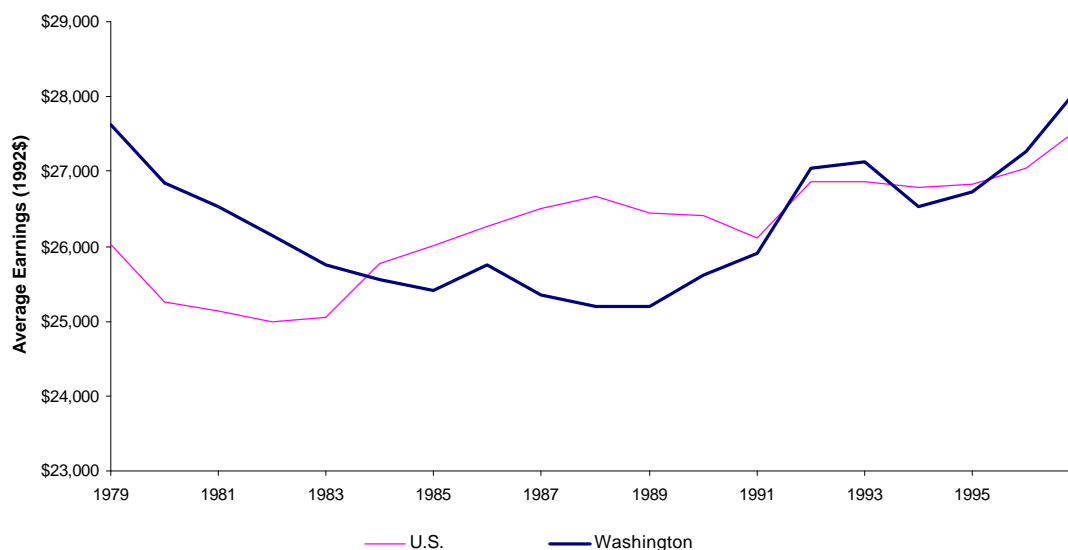
**Table 4-3
Personal Income Trends: Washington and U.S.**

Year	Total Real Personal Income (1992 Dollars)				Per Capita Income (1992 Dollars)			
	Washington (Billions)	Annual Change (%)	U.S. (Billions)	Annual Change (%)	Washington	Annual Change (%)	U.S.	Annual Change (%)
1970	48.57		2,838.64	2.9	14,195		13,821	
1971	48.93	0.7	2,920.65	2.9	14,248	0.4	14,047	1.6
1972	51.12	4.5	3,099.42	6.1	14,880	4.4	14,750	5.0
1973	54.84	7.3	3,293.14	6.2	15,810	6.3	15,523	5.2
1974	56.47	3.0	3,283.78	-0.3	15,993	1.2	15,335	-1.2
1975	58.55	3.7	3,294.20	0.3	16,295	1.9	15,235	-0.7
1976	62.04	6.0	3,448.26	4.7	16,928	3.9	15,795	3.7
1977	64.74	4.3	3,580.98	3.8	17,215	1.7	16,237	2.8
1978	70.64	9.1	3,771.72	5.3	18,161	5.5	16,921	4.2
1979	74.92	6.0	3,896.23	3.3	18,559	2.2	17,286	2.2
1980	76.61	2.3	3,919.68	0.6	18,377	-1.0	17,193	-0.5
1981	78.39	2.3	4,030.05	2.8	18,457	0.4	17,504	1.8
1982	77.81	-0.7	4,042.40	0.3	18,145	-1.7	17,391	-0.6
1983	78.88	1.4	4,107.86	1.6	18,240	0.5	17,513	0.7
1984	81.63	3.5	4,390.41	6.9	18,648	2.2	18,555	5.9
1985	83.74	2.6	4,537.47	3.3	18,889	1.3	19,006	2.4
1986	87.01	3.9	4,666.37	2.8	19,394	2.7	19,369	1.9
1987	89.22	2.5	4,789.67	2.6	19,562	0.9	19,704	1.7
1988	92.91	4.1	4,956.27	3.5	19,943	1.9	20,203	2.5
1989	97.72	5.2	5,084.30	2.6	20,443	2.5	20,527	1.6
1990	103.39	5.8	5,162.16	1.5	21,028	2.9	20,625	0.5
1991	105.67	2.2	5,128.88	-0.6	20,949	-0.4	20,274	-1.7
1992	110.23	4.3	5,255.68	2.5	21,349	1.9	20,553	1.4
1993	112.59	2.1	5,338.60	1.6	21,341	0.0	20,661	0.5
1994	115.12	2.2	5,475.64	2.6	21,437	0.5	20,987	1.6
1995	119.59	3.9	5,645.16	3.1	21,892	2.1	21,437	2.1
1996	125.54	5.0	5,854.38	3.7	22,617	3.3	22,029	2.8
1997	132.53	5.6	6,067.57	3.6	23,514	4.0	22,624	2.7
1998	141.52	6.8	6,318.66	4.1	24,770	5.3	23,355	3.2
Forecast								
2000	146.86		6,609.20		25,098		24,018	
2005	166.86		7,375.07		26,778		25,738	
2010	194.31		8,363.71		29,216		28,037	
2015	221.66		9,325.36		31,263		30,010	
2020	251.20		10,389.54		33,355		32,130	
Average Annual Growth Rate (%)								
1995-2000		4.2		3.2		2.8		2.3
2000-2005		2.6		2.2		1.3		1.4
2005-2010		3.1		2.5		1.8		1.7
2010-2015		2.7		2.2		1.4		1.4
2015-2020		2.5		2.2		1.3		1.4
1970-1995		3.7		2.8		1.7		1.8
1995-2020		3.0		2.5		1.7		1.6

Changes in Real Average Earnings in Washington, 1979-97

Real average earnings in Washington, compared with the national average, have varied over time. Between 1979 and 1989, state real average earnings declined relative to the U.S., but in 1989 the trend began to reverse. By 1997, Washington real average earnings were about 2.0 percent above the national average (Figure 4-7).

Figure 4-7
Real Average Earnings: Washington vs. U.S.



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In 1979, real average annual earnings in Washington were \$27,618 (1992 dollars). But by 1989, average real earnings in the state dropped by \$2,429 to \$25,188. During the same period, average real earnings in 1992 dollars in the U.S. increased slightly from \$26,040 to \$26,458. In percentage terms, Washington's real average earnings per worker declined by 8.8 percent between 1979 and 1989, while real average earnings in the U.S. increased by 1.6 percent. Consequently, real average earnings in Washington changed from 6.1 percent higher than the U.S. in 1979 to 4.8 percent below the national average in 1989.

Since 1989, however, Washington's average earnings have grown faster than the U.S. average. In 1997, real average earnings in Washington were \$28,146, representing a gain of \$2,958 over the 1989 level. Real average earnings in the U.S. also increased during the period, but only by \$1,130. Over the period of 1989 to 1997, Washington average real earnings rose by 11.7 percent, compared to the much lower growth of 4.3 percent for the nation as a whole. As a result, starting in 1996, real average earnings in Washington again rose above the national average.

The analysis below discusses real average earnings using several components:

- **Industry composition** – Industry composition refers to how jobs are distributed among the industries of the Washington or U.S. economy. Changes in industry composition affect average earnings because different industries have different wage and earning levels. A shift in employment from high wage industries such as manufacturing and construction to lower wage industries like personal services and retail trade affects aggregate average earnings.

Over the last two decades both the state and the nation have seen a dramatic change in industry composition. In both economies there has been a shift away from high-paying manufacturing jobs toward lower paying retail trade and services jobs. In the 1980s, this shift slowed down the growth of real average earnings in the U.S., but contributed to an actual decline in real average earnings in Washington.

- **Changes in real earnings within industries** – This component, by far, has been the most important contributor to the changes in Washington’s real average earnings over the past two decades. Changes in real average earnings within industry sectors can be caused by a variety of factors including new technologies, changes in organizational structures, unionization, labor force supply, product and market changes, or performance of the regional, national, and international economies.
- **Incidence of part-time jobs** – Since average earnings are computed by dividing employment (with no regard to part-time or full-time status) into total earnings, an increase in the incidence of part time work would decrease average earnings. Part-time workers typically earn less than full-time workers in the same industry, due to fewer working hours and lower average wage rates. The fact that part-time workers often receive no or only partial non-wage benefits also lowers the earnings of part-time workers in relation to full-time workers. The percentage of part-time jobs relative to full-time jobs has been increasing steadily in the 1980s.

Trends in part-time employment are also related to changes in industry composition. Manufacturing jobs tend to be full-time. A much higher proportion of jobs in services and retail trade are part-time jobs. The steady loss of high quality, “family wage” jobs has been accompanied by a rise in part-time employment. Many part-time jobs are held by the second wage earners in households. While the entry of secondary household wage earners may have contributed to raising household incomes, to some extent it has also been a response to the decline in real average earnings of primary workers in the households.

- **State versus nation factors** – In addition to the contributions of industry composition, growth in part-time jobs, and earnings changes within industries, this analysis also examines the relative contributions of state and national factors to changes in Washington’s average earnings. For example, some changes in industry composition in Washington resulted from national factors affecting all states, while other changes were due to factors particular to Washington. Thus in the analysis, the “industry composition” component of the earnings change is further divided into changes due to national factors verses state conditions. A similar distinction is provided for the other factors affecting real average earnings.

The method used to compute the change in real average earnings is depicted in detail in Appendix B to this chapter.

Real Average Earnings Decline in Washington, 1979-89

Washington real average earnings declined by \$2,429 from 1979 to 1989. The contributions of each of the four components of change are shown in Table 4-4. The first component, the change in industry composition, is responsible for about 24 percent of the total change. As the breakdown between national and state factors indicates, the change in Washington industry composition was strongly influenced by national trends during this period. This reflects the fact that most of the employment growth in both Washington and the U.S. between 1979 and 1989 took place in the lower wage employment sectors such as services and retail trade.

Table 4-4
Washington Real Average Earnings*: Components of Change (1979-89)

	Change in			
	Industry Composition	Incidence of Part-Time Work	Average Earnings Within Industries	Total Change
State Factors	\$90	(\$172)	(\$2,636)	(\$2,718)
National Factors	(\$669)	\$47	\$911	\$289
TOTAL	(\$579)	(\$125)	(\$1,725)	(\$2,429)

*In 1992 dollars.

The second major component of change is the incidence of part-time work. There was a large difference in the growth rates of part-time work for Washington and the U.S. between 1979 and 1989. In 1979, Washington and the U.S. were fairly close in the incidence of part-time work. In that year the proportion of Washington workers employed on a part-time basis represented 18.7 percent of total employment. In the U.S. the proportion was 17.8 percent. Over the next ten years, Washington's proportion of part-time employees increased more than for the U.S. By 1989, Washington had 20.5 percent of total employment in part-time jobs, significantly above the 18.6 percent share for the nation. However, as Table 4-4 indicates, this component had a relatively small effect on the change in real average earnings in Washington, accounting for only about one-twentieth of the 1979-89 decline in real average earnings in Washington.

The third and largest contributor to the earnings decline between 1979 and 1989 is the change in real average earnings within industries. Almost three-fourths of the decline in real average earnings in Washington could be attributed to this component of change. State factors made a very large negative contribution to this change, which was offset somewhat by positive national changes. From 1979 to 1989, real average earnings declined within virtually all sectors of the Washington economy.

Rebound in Washington Real Average Earnings, 1989-97

The divergence of growth trends in real average earnings between the U.S. and Washington reached its maximum in 1988.

As Table 4-5 shows, by 1997 real average earnings in Washington had recovered most of the ground lost during the 1979-89 period. Changes in industry composition continued to have a significant negative contribution to average earnings during the period from 1989 to 1997. However, this negative effect of changing industrial composition on earnings growth was not unique for this state, but occurred nationwide.

Table 4-5
Washington Real Average Earnings*: Components of Change (1989-97)

	Change in			
	Industry Composition	Incidence of Part-Time Work	Average Earnings Within Industries	Total Change
State Factors	\$23	(\$235)	\$2,419	\$2,207
National Factors	(\$651)	\$113	\$1,289	\$751
TOTAL	(\$628)	(\$122)	\$3,708	\$2,958

*In 1992 dollars.

The proportion of part-time work in Washington increased slightly from 1989 to 1997. So the change in the incidence of part-time work produced only a negligible effect on real average earnings in Washington. Here, national factors exhibited a modest positive effect on average earnings in Washington, as the proportion of part-time workers in the nation's workforce stopped rising.

As in the 1979-89 period, the biggest contributor to the change in Washington average earnings since 1989 was the earnings changes within industries. In a reversal of the trend from 1979 to 1989, real average earnings in Washington grew in most sectors of the state economy and also exceeded those in the U.S. in most industry sectors. Between 1989 and 1997, Washington real average earnings increased by \$3,708 due to changes in this component. Two-thirds of this total could be attributed to state factors and the remaining 35 percent to national factors.

Some Explanations for the Earnings Changes

A generally accepted explanation of the causes of the earnings changes is still lacking. Analysis of the nationwide survey data and other more detailed information is required for a better understanding of the earnings changes in the state. However, based on aggregate level employment and earnings data presented here and other similar data analyzed at the national level, the following factors appear to be associated with the changes in average earnings:

- **National factors in the change in industry composition (1979-1989)** – Beginning in the late 1970s, high-paying jobs were lost as many U.S. manufacturing industries failed to keep an edge over advances abroad in technology, organization, and management. The spread of advanced mass production technologies to countries with less skilled and lower wage workers, together with the increased global mobility of capital, also resulted in a shift of some production abroad.

Between 1979 and 1989, two monetary developments further eroded the base of high-paying production jobs. The enormous appreciation of the dollar value in relation to foreign currencies in

the late 1970s and early 1980s made the cost of U.S. goods much higher abroad and the prices of foreign goods much lower at home. In addition, high real interest rates in the U.S. discouraged investment and depressed the demand for durable goods.

These circumstances exacerbated a long-term decline in manufacturing jobs due to increases in worker productivity. For example, by the late 1980s, Washington's lumber and wood products industry was producing the same amount of lumber as in the late 1970s, with about one-third fewer workers.

- **State factors in the change in industry composition (1979-1989)** – The negative effect of industry composition on personal earnings in Washington merely mirrored a nationwide phenomenon. Still, some special circumstances occurred in the state that affected earning levels. For example, the termination of Washington Public Power Supply System nuclear reactor construction resulted in the loss of thousands of high-skill, high-wage construction jobs in the early 1980s.
- **State factors in the earnings decline within industry sectors (1979-89)** – For many Washington industries, a large portion of their output is exported. The fortunes of these Washington industries depend heavily upon markets outside the state. The state economy began the 1980s with relatively high wages, strong labor unions, but dependence on several major manufacturing sectors that were increasingly subject to international competitive pressures. Also, in the 1980s, competition from other regions of the country affecting major Washington sectors, such as lumber, ship-building, and aluminum, placed additional downward pressure on wages in Washington industries.

Real average wages declined in nearly all sectors of the Washington economy during the 1980s. Strong productivity gains in goods-producing sectors, which had boosted real wages in the 30 years after World War II, slowed down considerably in the 1970s and 1980s. Competitive international pressures (exacerbated by a rising dollar) also forced businesses to reduce costs and hold down wages. Real wage declines in manufacturing and construction spread to services, retail trade, and other secondary sectors.

- **State factors in the (1989-97) earnings rise within industry sectors** – Since the late 1980s, employment profiles have changed for many major industries in Washington. High-skilled and better-paid occupations account for an increasing share of jobs in these industrial sectors. For example, a growing proportion of manufacturing employment includes professional technicians and engineers, outpacing the growth in support staff (i.e., clerks and secretaries) and production/assembly line workers. Consequently, within-the-industry earnings have been rising rapidly and have contributed to a significant increase in real average earnings in the state.

The soaring equity market in the 1990's has contributed substantially to the earnings of workers in the state's growing high-tech industries (namely, software and biotechnology), where exercised stock options comprise a major portion of employee earnings.

APPENDIX 4-A PER CAPITA PERSONAL INCOME MODEL

A regression model was developed to project Washington per capita personal income over the next 25 years. Structure of the model, and the factors selected for determining the future state personal income level, are based on the discussions of historical income trends in Washington in this chapter.

The model extrapolates from the observation that the Washington per capita personal income has been moving in tandem with the U.S. per capita personal income. It also shows that several factors can cause the state per capita income to depart from the corresponding national trend:

- Factors that affect real interest rates, boosting or depressing production and employment in Washington's interest rate sensitive industries.
- Annual growth of manufacturing employment– the traditional high wage sector of the Washington economy.
- Differential in the unemployment rates between Washington and the U.S.
- Washington/Seattle Consumer Price Index (CPI) inflation rate relative to the U.S. CPI inflation rate.

Washington Long-Term Per Capita Personal Income Model

$$R_PCPI = 9.888 + 0.912 \cdot R_PCPI(-1) - 0.159 \cdot RINTRT - 0.295 \cdot D_RU_WAUS(-1) + 22.823 \cdot D_CPI_WAUS(-3) + 0.471 \cdot CHG_EMP_M_WA(-2)$$

R_PCPI: Ratio of Washington per capita income to U.S. per capita income.

R_PCPI(-1): Ratio of Washington per capita income to U.S. per capita income; lag 1 quarter. (t = 33.1)

RINTRT: Real interest rate*. (t = -3.8)

D_RU_WAUS(-1): Unemployment rate differential: Washington - U.S.; lag 1 quarter. (t = -2.1)

D_CPI_WAUS(-3): CPI inflation differential: Seattle - U.S.; lag 3 quarters. (t = 2.3)

CHG_EMP_M_WA(-2): Manufacturing jobs as a share of total Washington employment; lag 2 quarter. (t = 1.7)

* Real interest rate is defined as the AA utility bond rate minus the DRI's "expected inflation" estimate.

Adjusted R-squared = 0.962

Standard deviation of dependent variable = 2.776

Standard error of regression = 0.541

APPENDIX 4-B
DECOMPOSITION OF AVERAGE EARNINGS

	Change in Industry Composition	Change in Average Earnings Within Industries	Change in Incidence of Part-Time Work	Total Change
State Factors	Sc	Sw	Spt	Stot=Sc+Sw+Spt
National Factors	Nc	Nw	Npt	Ntot=Nc+Nw+Npt
Total	Ctot=Sc+Nc	Wtot=Sw+Nw	PTtot=Spt+Npt	CHtot=Ctot+Wtot+PTtot

Ctot =

$$\Sigma[\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * \text{PTpct79} * 0.5] + [\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot79} - \Sigma[\text{AVEARNfte79} * \text{SHARE88} * \text{EMPtot88} * \text{PTpct79} * 0.5] + [\text{AVEARNfte79} * \text{SHARE88} * \text{EMPtot88} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot88}$$

Nc =

$$\Sigma[\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * \text{PTpct79} * 0.5] + [\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot79} - \Sigma[\text{AVEARNfte79} * \text{NSHARE88} * \text{EMPtot88} * \text{PTpct79} * 0.5] + [\text{AVEARNfte79} * \text{NSHARE88} * \text{EMPtot88} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot88}$$

Sc = Ctot-Nc

Wtot =

$$\Sigma[\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * \text{PTpct79} * 0.5] + [\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot79} - \Sigma[\text{AVEARNfte88} * \text{SHARE79} * \text{EMPtot88} * \text{PTpct79} * 0.5] + [\text{AVEARNfte88} * \text{SHARE79} * \text{EMPtot88} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot88}$$

Nw =

$$\Sigma[\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * \text{PTpct79} * 0.5] + [\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot79} - \Sigma[\text{NAVEARNfte88} * \text{SHARE79} * \text{EMPtot88} * \text{PTpct79} * 0.5] + [\text{NAVEARNfte88} * \text{SHARE79} * \text{EMPtot88} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot88}$$

Sw = Wtot-Nw

PTtot =

$$\Sigma[\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * \text{PTpct79} * 0.5] + [\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot79} - \Sigma[\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot88} * \text{PTpct88} * 0.5] + [\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot88} * (1 - \text{PTpct88}) * 1.0] / \text{EMPtot88}$$

Npt =

$$\Sigma[\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * \text{PTpct79} * 0.5] + [\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot79} * (1 - \text{PTpct79}) * 1.0] / \text{EMPtot79} - \Sigma[\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot88} * \text{NPTpct88} * 0.5] + [\text{AVEARNfte79} * \text{SHARE79} * \text{EMPtot88} * (1 - \text{NPTpct88}) * 1.0] / \text{EMPtot88}$$

Spt = PTtot-Npt